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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ex Parte

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Washington, D.C. 20554

Re: *Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*
CC Docket Nos. 01-338, 96-98, 98-147

Dear Ms. Dortch:

Enclosed for filing is a white paper from Professor Robert D. Willig entitled "Determining 'Impairment' Using the *Horizontal Merger Guidelines*' Entry Analysis" in connection with the above referenced matter. This paper explains why the entry framework used by the federal antitrust authorities can inform the Commission's impairment analysis under section 251(d)(2) of the Communications Act. The paper further demonstrates that a rigorous application of the *Horizontal Merger Guidelines* shows that competitive carriers would be impaired if they were denied unbundled access to loops, transport and switching facilities.

Very truly yours,

C. Frederick Beckner, III

Encl

cc: Jeremy Miller
Thomas Navin
Daniel Shiman
Robert Tanner
Simon Wilkie

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DETERMINING "IMPAIRMENT" USING THE *HORIZONTAL MERGER GUIDELINES* ENTRY ANALYSIS

Robert D Willig[1]

In my October 11, 2002 presentation to the Commission Staff, I provided testimony that responded directly to the D C Circuit's criticism of the *UNE Remand Order*[2] that the Commission's prior "impairment" analysis impermissibly considered "universal" cost disadvantages that apply in any industry, rather than limiting its consideration to cost disadvantages "linked (in some degree)" to "natural monopoly" characteristics of the local exchange network[3] In particular, **1** identified three specific features of telecommunications markets that create substantial barriers to deployment of alternative facilities by competitive carriers: (I) scale (and scope) economies, (2) sunk costs, and (3) other costs that new entrants must incur but incumbents do not and that therefore constitute entry barriers that create a non-transitory cost disadvantage for entrants I hrther explained why it can be "wasteful," in the strict economic meaning of the word, to duplicate facilities that involve both scale economies and sunk costs. Finally, I demonstrated why entry without reliance on unbundled network elements ("UNEs") is not viable where the entrant, simply by virtue of being the second mover, has substantially higher costs than an incumbent who has already constructed facilities that can serve both existing and foreseeable future demand.

During my presentation, I was asked whether I was aware of the existence of any other framework for quantifying entry barriers that might assist the Commission in conducting its impairment analysis. I responded that the ***Horizontal Merger Guidelines*** issued by the United States Department of Justice and the Federal Trade Commission (hereinafter "the ***Guidelines")*** employ a well-accepted methodology for identifying entry barriers and that, in my view, the *Guidelines*' basic approach could be used for determining impairment under section 251(d)(2) of the Communications Act.

In the remainder of this paper, I explain in greater detail why I believe that the Commission's impairment analysis should incorporate the standards used in the ***Guidelines*** for assessing ease of entry. I then apply the entry tests articulated in the ***Guidelines*** to the three principal elements in dispute in this proceeding. loops, transport and switching. Finally, I explain why the Commission's impairment analysis must not only seek to determine whether entry is likely, but also whether it is "sufficient" to prevent the competitive concerns at issue.

1. The Guidelines' Entry Standards. Although the ***Guidelines*** obviously were not created to determine "impairment" under section 251(d)(2), I that the ***Guidelines,*** properly

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[1] Professor of Economics and Public Affairs, Princeton University. **As** I explain below, I have relied on the Commission's Synthesis Model to quantify certain economic parameters that are relevant to my analysis. In undertaking these calculations, I have received valuable assistance from Richard N Clarke of AT&T Corp

[2] I5 FCC Rcd. 3696 (1 999)

[3] *United States Telecomm Assoc. v. FCC,* 290 F.3d 41 5, 427 (D.C. Cir. 2002)

applied, can be a useful tool to the Commission in conducting its impairment analysis. Specifically, the ***Guidelines*** are concerned with whether a proposed merger will increase the likelihood that the parties, once they form a combined entity, either unilaterally or through coordinated conduct, could profitably exercise market power by increasing prices. In particular, the *Guidelines* ask whether the merging parties could hypothetically increase prices profitably by a "small but significant and nontransitory amount'' – *i.e.*, an "increase of five percent lasting for the foreseeable future."[4] To the extent that either existing firms or new entrants would be expected to undercut such a price increase by offering comparable services at lower prices, then the *Guidelines* would conclude that the merging parties would not be able to exercise market power, and the federal antitrust authorities would not oppose the proposed merger In cases where existing firms in the relevant markets affected by the merger would not undercut a price increase by the merging parties, a critical question under the ***Guidelines*** is whether new entry would he likely to occur, and whether such entry would be sufficient to constrain potential price increases.

In conducting its impairment analysis, the Commission is making a similar inquiry The central policy question posed by the impairment standard is whether there is an adequate likelihood that multiple firms would offer competitive retail local services absent a requirement that particular network elements be unbundled The case for unbundling a network element is made if denying competitive carriers unbundled access to that particular element would render those carriers unable to offer effectively competitive alternative retail offerings. For example, switching should be required to be made available as a UNE if denying competitive carriers access to unbundled switching would mean that these carriers could not obtain switching from alternative sources (including themselves) at a cost (both to purchase and install the switch and connect it with other leased and owned transmission facilities) that would give them the opportunity to use that switching functionality to offer meaningful competition to the incumbent.

The Commission, however, should not simply be satisfied with entry that is sufficient only to prevent incumbents from increasing already excessive charges. Instead, because existing retail regulatory schemes generally do not prevent incumbent carriers from lowering prices in response to competition, the Commission should continue to mandate unbundled access to network elements to the extent that such access is necessary to drive retail rates towards costs. On the other hand, I recognize that, in some instances, the incumbents assert that regulatory rules force them to sell some residential services at retail prices ***below*** their costs (although, as I have explained in my reply declaration in this proceeding, I believe the incumbents have overstated the extent that this is true). That said, it would make no sense, from an economic perspective, to determine impairment on the basis of hypothetically "rebalanced" retail rates because it is the existing and expected real world conditions that matter when determining the ability of competitive carriers to enter local markets.

In sum, I believe the Commission can use the ***Guidebnes*** as a tool to help identify whether the denial of unbundled access to a particular input would allow an incumbent to exercise market power. To the extent that such denial would enable incumbents to maintain supracompetitive prices or to increase prices for the services that are provided over the element

[4] ***Guidelines*** § 1.11

in question, then the Act's policies for the public interest dictate that access should be granted, in order to facilitate "intramodal" competition that would prevent the incumbent carrier from exercising market power. And given the record evidence that there are very few instances where there has been sufficient deployment of competitive facilities such that *existing* facilities-based competitors effectively constrain incumbents' market power, the focus of this analysis must be on *entry* ***barriers*** that could prevent competitive carriers from self-deploying their own incremental competing facilities. In other words, a key question is: "if unbundled access to the element in question were denied, would a competitive carrier be able to enter the 'market' for this element (*i.e.*, self-supply the element) at costs that would both allow it to be profitable and to offer consumers a meaningful alternative for end-user services?" Where the answer is that competitive carriers are unlikely to be able to enter and self-supply the network element at issue, the Commission should find that competitive carriers are "impaired" without unbundled access to that element

In assessing the likelihood of entry, the *Guidelines* make three fundamental inquiries. Below, I explain the economic basis for each inquiry and how the inquiry could be conducted in the context of determining impairment under the 1996 Act.

a. Sunk costs. The *Guidelines* examine whether entry requires the "expenditure of significant sunk costs.'" "A significant sunk cost is one which would not be recouped within one year of the commencement of [service], assuming a 'small but significant and non-transitory' price increase in the relevant market."' To the extent entry does *not* require sunk investments, the *Guidelines* would treat both existing and significant potential entrants as market participants, provided that entry from the latter could also be expected to be profitable (as described below in part I.c)

The reasoning here is straight-forward Where entry can occur without significant sunk costs, it is not particularly risky. Thus, where there are firms at the "edge of the market" and that have the incentive and ability to enter should prevailing prices be raised, such entry can be considered likely, so long as those potential entrants would not suffer systematic cost disadvantages relative to the incumbent.

Conversely, sunk costs (which are unrecoverable if the firm fails) make entry risky. First, where entry involves sunk costs, it is rational for the incumbent to respond to new entry by pricing all the way down to its short run marginal cost, which (because of the existence of sunk costs) is likely below the incumbent's (and the entrant's) average cost. The rational prospect that the incumbent will do this makes it less likely that an entrant can be profitable, and its entry will thus be deterred. This is particularly true where the incumbent serves virtually the entire market and the new entrant must convince substantial numbers of customers to switch from the

[5] It is possible that in some instances several competitive carriers may have already built the facilities in question and provide effective competition to the incumbent. In such a case, one would expect to see a functioning "wholesale market" where the participants, including the incumbent, offer access to their networks voluntarily at (near) cost-based rates.

[6] *Guidelines* § 1.32

[7] ***Id***

incumbent in order to achieve economic viability. Second, it is often the case that sunk costs are also fixed and therefore higher sunk costs also indicate greater scale economies. Where scale economies exist, in order for an entrant to achieve a cost structure comparable to the incumbent, the entrant must deploy substantial capacity. But entry on such a massive scale will flood the market with excess capacity, making it unlikely that the entrant will be able to sell services at a price that will allow it to recover its sunk investment. Knowing this to be the case **ex** *ante*, the entrant will be deterred from entering and sinking its costs.'

Accordingly, when analyzing impairment that is focused on an entrant's ability to construct a particular functionality, the Commission should independently analyze whether self-supply of a network element providing such functionality requires a competitive carrier to sink significant costs. To the extent that it does, hrther analysis **is** required (as explained below in Part 1 b). And regardless of whether or not self-supply of the network element requires a competitive carrier to incur sunk costs, the Commission would also need to assure itself that new entrants do not suffer from any significant and systematic cost disadvantages as described below in Part 1.c

b. Minimum Viable Scale. Where entry requires a firm to sink significant costs, the *Guidelines* then examine whether the "minimum viable scale" of entry is less than the "likely sales opportunities available to entrants."[9] Minimum viable scale is the "smallest annual level of sales that the committed entrant must persistently achieve for profitability."[10] In other words, minimum viable scale is the scale at which an entrant can achieve a cost structure comparable to the incumbent and thereby achieve profitability

The primary likely sales opportunity identified by the *Guidelines* is an entrant's ability to capture customers that cease buying the merging parties' services should the merging parties

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[8] The incumbents have in the past mischaracterized rhis argument as a "predatory pricing" claim. SBC Reply at 149 It is not My argument about sunk costs is not that once a carrier has deployed facilities, the incumbent will respond with below-cost rates. Rather, my point is that the presence of sunk costs deters entry **ex *ante*.** For example, in the context of local loops, competitive carriers are deterred from building loops to a customer because that entire investment will be lost if the incumbent is able to keep the customer from switching (such as by lowering prices when the competitive carrier is in the middle of construction). Thus, it is the likely prospect that the incumbent will respond to the entry by lower prices that deters the entry from happening at all. The Commission has recognized precisely this point. *Section 257 Report*, 12 FCC Rcd. 16802, ¶ 18 n.48 (1997) ("If entry into an industry requires large sunk costs, the firm that incurs these sunk costs first (the incumbent) can have a tremendous advantage. Potential new entrants may realize that any large scale facilities-based entry into the market will probably force prices to decrease and those prices may be in fact below the point necessary to recover the sunk cost investment. **As** a result, facilities-based entry will be deterred."); *MCI-BT **Merger Order,*** 12 FCC Rcd. 15,351, ¶ 162 (1997) (same).

[9] *Guidelines* § 3.3

[10] *Id.*

attempt to raise prices." As noted, the *Guidelines* calibrate to a five percent increase in price over existing (presumptively competitive) levels." For an entity with putative market power and the ability to raise prices above competitive levels, the five percent price increase should result in no less than a five percent reduction in output." Thus, the basic inquiry conducted by the ***Guidelines*** is whether, for entry that requires significant sunk costs, the entrant's costs will be below existing prices if that entrant is able to serve the five percent of the relevant market that becomes available as a result of the hypothesized exercise of market power by the merging parties.

The ***Guidelines'*** focus on minimum viable scale is consistent with sound economics. The minimum viable scale metric used in the ***Guidelines*** directly measures the extent of fixed and sunk costs and, therefore, the likelihood of entry "The minimum viable scale of an entry alternative will be relatively large when the fixed costs of entry are large [and] when the fixed costs of entry are largely sunk . . . ."[14] As fixed and sunk costs increase, the minimum viable scale necessary for viable entry will increase as well

Where there are economies of scale, a new entrant will ordinarily incur higher per-unit costs than the incumbent, making it difficult for it to win sufficient customers away from the incumbent. If such costs are also sunk, a potential entrant knows that it will not be able to recover its costs if it is unable to offer a viable service on a sustained basis. Further, as I explained above, because the incumbent's costs in comparable facilities have already been sunk, it has very low marginal costs, creating a significant threat that the incumbent could drop its prices to that level in response to competitive inroads The rational threat that the incumbent will do this makes it even less likely that the entrant could be profitable if it had to construct its own facilities, further deterring its entry

It is no answer to say that these problems could be overcome if an entrant were only willing to take a leap of faith and enter at a scale comparable to the incumbent's. Even if financing for such an entry were available, such massive entry would swamp the market with capacity and be economically wasteful Rational entry decisions are based on the prices that will prevail ***after*** entry. When substantial amounts of sunk capacity are added to a market, all participants face increased pressure to lower prices towards marginal costs. And given the existence of substantial fixed costs, this pressure will make it increasingly unlikely that the entrant could charge prices that would enable it to recover all of its costs. Further, where entry costs must be sunk. there is a substantial risk that the investment would never be recovered. The potential entrant, understanding this **ex *ante,*** would rationally choose not to enter.

With regard to the other half of the equation – the revenue opportunities that exist for new entrants – I believe that, in this specific context, a *lower* level of sales opportunities may be appropriate than the baseline five percent identified by the ***Guidelines.*** As discussed, the

[11] *Id.*

[12] ***Id.*** §§ 1.11, 3.3 n 32

[13] *Id.* § 3.3 n.32

[14] *Id.* § 3.3 n.31

relevant issue here is *not* whether competitive carriers would be able to enter if incumbents' raised prices, but whether they will be able to use their own facilities to enter at the existing (or expected) prices Hence, in this context, entrants will not have the "benefit" of the opportunity that ordinarily presents itself when an incumbent firm increases prices.

Further, as the *Guidelines* make clear, sales opportunities for new entrants may be minimal for other reasons. For example, the *Guidelines* would find lower sales opportunities if the incumbent provider has locked up customers with long-term contracts." Incumbent carriers routinely serve the largest and potentially most lucrative telecommunications customers pursuant to such contracts, making it difficult for entrants to gain share. Likewise, the *Guidelines* appropriately recognize that if the market is declining, both new entrants and incumbents alike will be impacted.[16] Again, with the bursting of the Internet bubble, growth in demand for telecommunications has moderated Finally, the *Guidelines* find lower sales opportunities where the incumbent has made sunk investment in capacity that is capable of serving both existing and foreseeable market demand [17] As I describe below, in many instances the incumbents have deployed excess and sunk capacity that is not only capable of serving existing demand, hut can serve foreseeable demand at extremely low marginal cost.[18]

In short, consistent with established antitrust economics, the *Guidelines* conclude that the greater the magnitude of the fixed and sunk investment and the greater the scope of entry a new entrant needs to achieve unit costs that are comparable to incumbent's, the less likely that such entry will occur. Similarly, where the market has a low growth rate or where incumbent providers have substantial excess capacity that is sunk, the *Guidelines* conclude that the entry that requires substantial scale is unlikely [19] Thus, in this context, application of the *Guidelines* would require the Commission to evaluate the minimum viable scale a new entrant would need to achieve *in* order to deploy its own facilities profitably if cost-based access to a particular network element were denied To the extent that the minimum viable scale is large relative to

[15] *Id.* § 3 3

[16] *Id.*

[17] *Id.*

[18] The *Guidelines* also list other factors that should be examined and that might counsel in favor of a higher figure, such as expected growth in demand. *See id.* § 3.3.

[19] In this regard, I note that one of the incumbent's economists, Dr. Shelanski, has at least implicitly attacked the idea that sunk costs deter entry by pointing to the example of the deployment of competitive wireless networks Verizon Reply, Shelanski Reply Dec. ¶ 4 Verizon General Counsel William Barr repeats this example in his recent letter to Chairman Powell urging the elimination of several existing UNEs. But the wireless example is fully consistent with the *Guidelines'* framework. In the case of wireless, there was exploding demand for wireless service that could not be served by the incumbent providers because of existing capacity limitations (including limitations on the amount of spectrum available to the incumbents) Although building a wireless network does involve some sunk costs, there was not enormous risk that this investment would be stranded because of the proven and substantial demand for wireless services that could not be met by existing providers.

expected sales opportunities, entry should be considered unlikely and impairment is demonstrated

c. *Other Entry Harriers.* The *Guidelines* also examine whether a potential entrant suffers from any absolute cost disadvantages *vis-à-vis* the incumbent that apply without regard to the investments a new entrant would have to make.[20] Such measures could arise from governmental requirements that apply uniquely or more harshly to new entrants, or from any other market fact that causes new entrants to incur significant costs in deploying – or using – a facility that the incumbent docs not Under well-established economic theory, any such measure constitutes an entry barrier, and unless a new entrant can offset these increased costs with savings in other areas, entry through alternative facilities cannot be expected.

This is true even where the incumbent's prices are well above costs. In such a scenario, the incumbent could simply drop its prices below the entrant's costs. The incumbent would remain profitable even at a reduced price, but by setting prices below the entrant's costs the incumbent would make it impossible for the entrant to remain economically viable The likelihood that the incumbent would engage in such a an entry-deterring pricing strategy is particularly high where an incumbent can price discriminate, because that allows the incumbent to lower prices selectively, *i.e* , only to those customers that could potentially be served by the new entrant, and thus to keep prices high for all other customers.

And even if the incumbent might view a particular entrant's competitive incursion as minimal, it might nonetheless collapse the prevailing "price umbrella" if additional competitors seck to enter. Thus, even if an entrant can be reasonably sure that prices will remain stable in the near term after entry by only one or two alternative suppliers, it cannot expect to be successful over the long term unless it enters at costs comparable to the incumbent's, because it will always face a significant risk that the incumbent will ultimately choose to lower its prices toward its costs

For these reasons, in determining whether competitive carriers are impaired without unbundled access to a particular network element, the Commission should examine whether new entrant competitive carriers, in seeking to self-supply a particular element, suffer from any systematic cost disadvantages relative to the incumbent. Under the *Guidelines,* any non-transitory, systematic cost disadvantage would be considered relevant. Thus, in reviewing whether new entrants are materially disadvantaged in supplying their own facilities, the Commission must not only determine whether economies of scale prevent competitive carriers

[20] *See Guidelines* §§ 1.11, 1.32 Section 1.11 makes clear that the antitrust authorities will consider, in determining entry, not only existing prices, but competitive prices. In a competitive market where prices converge at costs, a firm with higher costs cannot viably enter the market. Likewise, the determination of "uncommitted entry" in Section 1.32 is based on the ability of firms to enter in response to a five percent price increase If the costs of the entrant are five percent higher than current prices, it will not be viewed as a entrant under the *Guidelines.* The need to examine whether an entrant can achieve costs comparable to the incumbent is also implicit in the *Guidelines'* minimum viable scale test. *See id.* § 3.3 . Where an entrant has significantly higher costs than the incumbent providers' price, its minimum viable scale is effectively infinity.

from achieving a cost structure comparable to the incumbent's, but also whether there are other factors that cause competitive carriers, by virtue of being "second movers," to have higher costs relative to incumbents."

2. Application **of the Standard** I now turn to applying these three tests to the principal network elements at issue.

a. Loops. Under a *Guidelines*-like approach, there can be little doubt that competitive carriers will, as a general matter, be impaired without access to unbundled loops. To the best of my knowledge, the incumbents do not seriously dispute that impairment exists with respect to copper loops Nonetheless, they assert that competitive carriers can replicate high capacity fiber loops used to serve mid- and larger-sized businesses

At the outset, it is important to stress that the economics of fiber-based loops are similar to the economics of copper-based loops **A** very substantial cost in deploying high capacity fiber loops stems from the structures upon or within which the conductors reside, as opposed to the actual cost of the conductors themselves.[22] Thus. the costs of loops are largely fixed and do not vary significantly with usage Further, as with all-copper loops, fiber loops connect only two points – *i.e.*, the central office and the customer's premises.[23]

Applying the ***Guidelines'*** standards to these facts shows that competitive carriers cannot be expected, as a general rule, to be able to deploy their own high capacity loops if they are denied unbundled access to incumbent loops. **As** discussed, the first question the *Guidelines* asks is whether entry would require the investment of significant sunk costs. Even assuming that a competitive carrier could obtain the other necessary inputs to local service without sunk costs, the investment in local loops alone requires the competitive carrier to incur substantial sunk costs

This should not be controversial. Most of the costs of loops are effectively sunk, because they cannot be redeployed elsewhere should a competitive carrier be forced to exit. Indeed, employing the Commission's synthesis model, I estimate conservatively that approximately 78 percent of loop investment is **sunk** [24]

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[21] Of course, to the extent that new entrants can avoid costs that incumbents incur, these offsetting advantages should be taken into account. **1** am not aware, however, of any significant savings achieved by competitive carriers, and the incumbents who oppose unbundling have certainly offered no quantification of any alleged savings.

[22] AT&T Reply at 167.

[23] In reality, no carrier self-provides local loops except where it has a nearby network that aggregates demand from dedicated loops to a shared facility (*i.e.*, transport). Thus, to the extent that competitive carriers cannot be expected to build their own transport facilities, *a fortiori* they will be unable to build their own loops.

[24] To determine the fraction of loop investment that is sunk, with the help of Dr. Clarke, I started with the aggregate forward-looking loop investment for the 95 nonrural study areas calculated by the Commission's Synthesis Model. I then assumed that of this loop investment, aerial cable, buried cable and underground cable are sunk, as are the fixed (non-channel card) investments in

(continued .)

Thus, under the *Guidelines*, the likelihood that a carrier could enter and provide telecommunications and data services that use local loops, if it were denied unbundled access to high capacity loops, would depend upon the minimum viable scale for entry Clearly, in the case of loops, carriers forced to self-supply loops would have an extremely high minimum viable scale. This is so for two reasons.

First, as discussed, most of the costs of loops are sunk. Second, loops have enormous scale and scope economies. For the entire route between the two points that the loop connects, the carrier must invest in *fixed* costs to construct the infrastructure necessary to support the fiber loop, including the trenching, cable conduits, rights of way, and building access Further, substantial scope economies can be achieved, at least by the incumbent, by using the same structure employed for interoffice transport for the feeder portion of the loop. Indeed, I understand that incumbents can use the same cable to provide interoffice transport and the feeder portion of customer loops. To the extent that competitive carriers have smaller and more geographically disparate customer bases, these basic network engineering principles suggest strongly that competitive carriers will be at a significant cost disadvantage *vis-à-vis* incumbents in self-deploying any type of loops

We need not guess at the extent of these scale and scope economies because they have been documented. In his initial declaration in this proceeding, using both the Commission's Synthesis Model and the HAI Model, Dr. Richard Clarke demonstrated that scale and scope economies exist for loops across the full range of demand [25] **As** Dr. Clarke shows, whether it is assumed that the competitive carrier's customer base is spread throughout a state, or concentrated in particular "clusters," the competitive carrier will have higher costs than the incumbent until it has a market share greater than the incumbent's (*i.e.*, over 50 percent)." For

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digital loop carrier ("DLC"). This leaves the conduit investments, the pole investments and the DLC channel card investments as potentially recoverable should the entrant be forced to exit the business. The former (sunk) investments amount to about 78 percent of total loop investments; the latter (recoverable) investments amount to about 22 percent of total loop investments. **1** note that this is likely an overestimate of the funds actually recoverable by the entrant because I have valued these "recoverable" loop investments at their full original cost — even though (due to the costs of redeployment) it is doubtful that they would fetch their original new price.

[25] *See* AT&T, Clarke Dec., Exh. 1-10

[26] The Commission's Synthesis Model engineers loop plant using a database containing a road surrogate location for every customer. It then groups these locations into serving areas ("clusters") and engineers feeder cables from existing wire center locations into each neighborhood. Within each cluster, distribution cables are then engineered to connect to all of the customer locations within the neighborhood, Because its unit of analysis is the individual customer, the Synthesis Model may be used to study situations where an entrant carrier is able to secure an assigned fraction of the individual customers within a neighborhood, or only a selection of the neighborhoods surrounding a wire center. Similarly, the HAI Model is based on a database of neighborhood clusters and the unit of analysis for calculation of costs is a cluster of customer locations served from an existing wire center. Thus, the HAI Model too may be used

(continued. . .)

example, even assuming (improbably) that a new entrant is able to secure a 30 percent market share in each cluster served by the incumbent in a state, Dr. Clarke's calculations show that the entrant's per-line loop cost will exceed the incumbent's by 57 percent [27]

Further, investment in loops accounts for the lion's share of the overall costs of retail telecommunications services Thus, even if a competitive carrier were able to obtain the other network elements necessary to provide telecommunications service (either as UNEs or from an alternative supplier, including self-supply) at TELRIC-based rates that allow the carrier to achieve the incumbent's scale economies for these other elements, the scale-driven cost disadvantage that the competitive carrier faces in self-deploying loops would be a significant percentage of the carrier's overall costs of providing service

AT&T has provided testimony in this proceeding quantifying the high minimum viable scale necessary for self-deploying loops. I am informed by AT&T's network and business professionals that, given the nature of the costs of local loops, AT&T cannot economically deploy a fiber lateral, even from a nearby existing transport ring, unless the building it seeks to serve will provide at least three DS3s worth of traffic. Given that most buildings (and all residences) do not generate that level of demand, for the vast majority of buildings, AT&T's minimum viable scale is greater than its existing revenue opportunities.[28]

And even as to those buildings that generate the enormous level of traffc that would potentially support a facilities build, the "available revenue opportunity" may not be there, because competitive carriers simply may not he able to obtain access to the customer In order to build a loop to a customer's premise, a competitive carrier must obtain permission from the landlord to deploy the necessary facilities on the property and many landlords see little additional value to their buildings from a second or third service provider. It is now well documented that because of this bias, competitive carriers are often denied building access altogether, *or* are offered access on terms that are patently unreasonable [29] In such cases, the minimum viable scale is effectively infinity. Similarly, it is also has been shown that many municipalities have sought to impose higher fees on competitive carriers for rights-of-ways than incumbents were assessed, or otherwise impose discriminatory terms and conditions for such access.[30]

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to study situations where an entrant carrier is able to serve only a small fraction of customers in each cluster, or to focus its service on only a subset of the clusters surrounding a wire center.

[27] *Id.* ¶ 3 I

[28] According to some reports, there are only about 50,000 – 60,000 buildings nationwide that have this level of demand that is sufficient to support competitive entry. AT&T *Ex Parte* Presentation, Comparing ILEC and CLEC Local Network Architecture, at 7 (Oct. 3, 2002) (*"AT&T Network Architecture Ex Parte"*). On the other hand, there are well over a million commercial buildings nationwide Declaration of C. Michael Pfau ¶ 43 (attached to Comments of AT&T Corp , CC Docket No. 96-98 (filed Apr. 30, 2001)).

[29] AT&T Reply at 171, 174-77

[30] *Id.* at 171, 177. The incumbents have taken the position in this proceeding that these real entry
(continued . . .)

The delay inherent in obtaining the necessary building access and rights-of-way also exacerbates the "chicken-and-egg" dilemma that new entrants face in self-deploying loops For the reasons discussed above, given the sunk costs of loop, no carrier can rationally build loop facilities merely on the hope that traffic will materialize on that point-to-point route. But many customers are unwilling to sign a contract for service and then wait months while the competitive carrier builds the necessary loop facilities [31] The longer the time that competitive carriers must spend negotiating with landlords and municipalities for necessary access and rights-of-way. the fewer customers that competitive carriers can serve using their own loop facilities.

These same considerations also show why competitors are impaired under the *Guidelines*' third inquiry – *i.e.*, whether competitive carriers face systematic cost disadvantages relative to incumbents Because of economies of scale and the risks inherent in deploying sunk facilities in competition with an entrenched incumbent that not only serves the vast majority of the market but also typically has available excess capacity, competitive carriers are likely to have higher costs than the incumbent over reasonably foreseeable levels of demand that they may serve. Also, as noted, second mover competitive carriers are typically subject to discriminatory charges for access to municipal rights-of-way.

The availability of unbundled loops mitigates, to some extent, the entry barriers identified by the *Guidelines*. Principally, the availability of unbundled loops permits a competitive carrier to avoid the necessity of sinking its costs prior to constructing a loop. **A** competitive carrier could first serve the customer using an unbundled loop, and then build its own loop once there is a reasonable prospect of having a revenue stream that will recover the sunk cost In the terminology of the *Guidelines*, this would allow the competitive carrier to engage in "forward contracting" to expand its sales opportunities [32]

In their reply comments in this proceeding, the incumbents have argued that unbundled access to loops is not necessary to eliminate **sunk** cost entry barriers. Instead, they maintain that competitive carriers can gain access to incumbent networks at "market" rates (*e.g.*, special access services) and use that access to gain a customer base and then deploy facilities once it is clear that there is sufficient demand to support those facilities.[33]

(. . . continued)
barriers should be disregarded by the Commission's impairment analysis because they can be "resolved directly" by the Commission with direct regulation ***See,*** *e.g.*, SBC Reply at 147-52; Verizon Reply at 93. I do agree with the incumbents to the extent that they argue that operational entry barriers that can be resolved with "direct" regulation should be resolved. But until those operational entry barriers are, in fact, resolved, it would clearly be unreasonable to ignore that they continue to be a source of impairment today

[31] AT&T Reply at 171-72

[32] ***See*** *Guidelines* § *3 3*

[33] See SBC Reply at 147 ("ILEC special access services are available to serve as a bridge while alternative sources are being deployed."); *id.* at 149 **("[A]** CLEC can buy capacity from the ILEC as a service . . . while it builds a customer base over which to spread the costs of deploying facilities."), Verizon Reply at 95-96 ("Further, to mitigate any delay while deploying facilities,

(continued. . .)

In advancing these arguments, the incumbents are implicitly assuming that the rates that the incumbents charge for access services, although higher than the corresponding UNEs, are low enough that a competitive carrier can still profitably offer service during the often substantial period of time in which the competitive carrier is using wholesale access as a "bridge." Given that the pricing standard that the Commission uses for determining UNE rates ("TELRIC") reflects the incumbents' own economic costs of accessing the facilities in question, if an new entrant must pay access rates for key inputs that are substantially in excess of TELRIC, it would, by definition, be at a significant cost disadvantage relative to the incumbent. And as discussed above, the *Guidelines* recognize that this type of cost disparity is a classic barrier to entry.

AT&T has provided substantial evidence that Bell access rates are well in excess of costs. According to the Bells' own ARMIS data, the Bells' rates of return in 2001 on special access services averaged 37.5 percent. Indeed, the Bells' special access revenues in 2001 exceeded levels that would have produced a 11.25% rate of return (the last rate of return the Commission found applicable to the Bells' special access services) by $5 billion. These excessive returns are especially remarkable considering that the Bells' ARMIS data are derived from the Bells' historical book costs, not their much lower forward-looking economic costs.[34] Thus, it is obvious that the incumbents' use of the term "market" rates means only "deregulated" rates, not rates reflective of a competitive market.

Finally, the entrants' impairment with respect to loops is caused both by sunk costs ***and*** economies of scale and scope. Even if it were always possible to use special access to win the customer first and then build and thereby eliminate the sunk cost disadvantage, competitive carriers still must be able to achieve scale economies comparable to those enjoyed by the incumbents in order *to* have a competitive cost structure. But as explained above, because of the incumbents' substantial scale and scope economies, competitive carriers are at a substantial cost disadvantage relative to incumbent carriers, which already have deployed loops to virtually every customer in their territories.

b. Transport. As with loops, the basic economic and engineering characteristics of deploying transport, when assessed using the ***Guidelznes'*** framework, demonstrate that competitive carriers would in most instances be impaired without unbundled access to transport at cost-based rates. This is because the incumbents' outside plant design for interoffice transport is driven by many of the same considerations that drive loop design. A substantial portion of the

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(. . continued)
CLECs can provide services by obtaining ILEC special access channel terminations at competitively disciplined rates "); ***Id,*** Shelanski Reply Dec. ¶ **4** (arguing that that sunk cost entry barriers are eliminated by the existence of "tariffed ILEC services").

[34] ***See*** Petition of AT&T, *In the* ***Matter of AT&T Corp. Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Hales for Interstate Special Access Services,*** RM No. 10593, at 7-11 (filed October **15**, 2002). To the extent that retail rates are based on existing special access rates, this is a classic situation where the incumbent has the headroom to deter entry. If an competitive carrier enters at costs above the incumbent's, the incumbent can drop prices below the competitive carrier's costs but above its own costs. In that way, the incumbent still earns a profit, but competitive entry is not viable.

costs of deploying interoffice transport is in the supporting infrastructure, including the structures, placement and rights of way. Because of these exceedingly high infrastructure costs, the cost of laying a fiber conductor having one strand is not appreciably less than the cost of laying a fiber conductor with dozens of strands In fact, because of the high costs of construction, the incumbents typically deploy the largest sized conductor that is practically usable, in order to minimize the likelihood of ever having to build a new facility route between the same two points And because the construction costs are so substantial regardless of the size of the conductor deployed, transport engineers seek to maximize the traffc carried over each route in order to spread the very high fixed costs of deploying these facilities across a large number of customers [35]

The incumbents ordinarily use fiber optic conductors almost exclusively throughout their transport networks that connect their tens of thousands of switches. Consequently, on almost any route where a competitive carrier might consider deploying its own transport facility, the incumbent has ***already deployed*** fiber transmission facilities that are capable of serving both existing and foreseeable demand

These economic facts again demonstrate that self-supply of transport is unlikely, except in exceptional circumstances. Like loops, the costs of transport are largely sunk. **A** transport *link* connecting two points cannot be re-deployed to another location should it turn out that service is not viable at that location Employing the Commission's Synthesis Model, I estimate that approximately **64** percent of transport investment is sunk."

Not only do transport facilities involve sunk costs, the evidence shows that a competitive carrier seeking to self-deploy transport would have a high minimum viable scale relative to available sales opportunity and, therefore, under the ***Guidelines,*** entry into local markets without access to unbundled transport is unlikely. Transport facilities share the same scale economy characteristics as loops. Like loops, transport consists of point-to-point cables supported by poles or buried in trenches or pulled through buried conduit. Thus, like loops, transport facilities have enormous fixed costs Also, with transport facilities, just as with loops, structure costs vary directly with distance: the greater the distance to be covered, the more poles or feet of trench or feet of conduit are required. Thus, for any given amount of traffic, the cost per unit of traffic will

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[35] **See *generally AT&T Network Architeciure Ex Parte.***

[36] I assume that, of the transport investment referenced in the Commission's Synthesis Model, the investment in aerial cable, buried cable and underground cable is sunk. That leaves conduit investment. pole investment and the transmission terminal investment as potentially recoverable should the entrant be forced to exit the business. Using the forward-looking transport investment generated by the Synthesis Model, the former (sunk) investments amount to about 64 percent of total transport investments; and the latter (recoverable) investments amount to about 36 percent of total transport investments. Again, this is likely to be a substantial overestimate of the funds actually recoverable by the entrant because I have valued these "recoverable" transport investments at their full original cost despite the fact that, due to the cost of redeployment, it is doubtful that they would sell for their original new price.

be lower where large amounts of traffic can be aggregated and carried a short distance than in areas where smaller amounts of traffic must be carried for longer distances.[37]

The magnitude of these scale economies has been shown by Dr. Clarke in his prior testimony in this proceeding. **As** with loops, scale and scope economies exist for transport across the full range of demand." Regardless of whether it is assumed that the competitive carrier's customer base is spread throughout a state, or concentrated, Dr. Clarke's analysis shows that the competitive carrier will be at a cost disadvantage until it has a market share greater than the incumbent. For example, assuming that a entrant secures a **30** percent market share in each "cluster" served by the incumbent in a state, its per-line transport cost will exceed the incumbent's by almost 178 percent.[39] On the other hand, if it is instead assumed that the competitive carrier gains a 100 percent market share in 30 percent of the clusters served by the incumbent in a state, the transport investment disadvantage grows to **214** percent.[40]

This level of cost disadvantage is significant because transport is a sizeable percentage of the overall cost of providing finished retail services in competition with the incumbent, especially for dedicated services that do not require switching. Basic economics shows that in general, even if a competitive carrier could lease the other inputs necessary to provide retail service from the incumbent at rates that reflect the incumbent's economic costs, the cost disadvantage a competitive carrier faces solely with regard to self-providing transport put it at a considerable competitive disadvantage for services that use transport as an input.

Indeed, AT&T has conducted a highly "granular" analysis that shows that competitive carriers are able to achieve a cost structure comparable to the incumbents' for particular point-to-point transport routes only if they are able to achieve substantial scale on those routes. According to the AT&T experts, taking into account the revenues for all of the services that can be provided over local transmission facilities (*i.e.*, local, special access, data, etc), self-deployment of transport is not considered to be viable until it has at least 18 or more DS3s of traffic at the location in question. which is the level that AT&T's transport costs become roughly

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[37] Moreover, incumbents also have an additional, enormous cost advantage because of their low marginal cost of adding capacity on existing facilities. **A** competitive carrier that is considering construction of new facilities along an existing incumbent fiber route must account for the fact that the incumbent can usually create the same capacity for itself by incurring only the relatively small *incremental* cost of adding electronics to its existing outside plant.

[38] AT&T, Clarke Dec., Exh. 1-10

[39] ***Id.*** ¶ *31*. Dr. Clarke did not **look** at any particular point-to-point routes in conducting this analysis, but rather assumed an overbuild necessary to serve the competitive carrier's entire demand.

[40] *Id.* This increase in cost disadvantage is due to the decreased inability to gain economies of scope by using the same cable to provide both interoffice transport and the feeder portion of customer loops.

comparable to the incumbent's transport costs (although still generally higher than the incumbent's costs).[41]

AT&T's filings in this proceeding have quantified the substantial scale economies enjoyed by the incumbents. For example, according to AT&T's calculation, when all of the costs of transport and collocation are considered, the average monthly cost per DS3 where AT&T has just one DS3 of demand, is approximately $35,000.[42] The average cost drops dramatically as traffic increases. Thus, at 10 DS3s of demand, the average monthly cost falls to $3,400 per DS3; at 18 DS3s it is reduced to about $1,900; and at 24 DS3s, it is in the range of $1,400 to $1,500.[43]

These numbers reinforce the reasons why entry is not viable unless the competitive carrier is able to obtain scale comparable to the incumbent – and why it is unlikely that a competitive carrier would be able to achieve such scale. I understand that a relatively large LSO has approximately 60,000 voice grade equivalents ("VGEs") of traffic, when all types of traffic are considered. Thus, a competitive carrier that is able to capture a reasonable share of the demand flowing through the such a LSO, say five percent (or 3,000 VGEs),[44] would require transport with two DS3s of capacity.[45] But the monthly per-unit costs of two DS3s is nearly nine times greater than the per-unit cost of 18 DS3s.[46] Thus, for a "typical" service where transport constitutes about a substantial percentage of overall costs, just this difference in scale translates into an enormous cost disadvantage On the other hand, in order for a competitive carrier to justify deploying 18 DS3s and thereby obtain a competitive cost structure, it would need to capture approximately 48,000 VGEs of demand,[47] which is more than the half the level of demand at a large LSO The ***Guidelines*** make clear that it is simply unrealistic to assume that a competitive carrier would be able to take this amount of traffic away from the incumbent (*i.e.*,

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[41] *AT&T* ***Network*** *Architecture Ex Parte* at 14. Because it is generally not feasible for competitors to self-provide their own loops, in most instances the first place that a competitive carrier can access a customer demand is at the incumbent's local serving office ("LSO"), where the customer's loop terminates This calculation, therefore, considers all the costs incurred in establishing a facilities-based collocation at the LSO.

[42] *Id.*

[43] *Id.*

[44] The calculation is 60,000 VGEs * 0.05 = 3,000 VGEs

[45] **A** single DS3 is equivalent to 672 VGEs **A** digital loop carrier provides for 4:1 line concentration, so there would be up to 2688 VGEs per DS3 of transport (4*672 = 2688) Two DS3s would, therefore, allow the competitive carrier to handle transport for over 5000 VGE lines, well in excess of the assumed five percent share (or 3,000 VGE lines) gained **by** the carrier

[46] *Id.* at 14. The per unit costs of deploying two DS3s is approximately $17,500 per month whereas the per unit costs ofdeploying 18 DS3s *is* approximately $1,900 per month. *Id.*

[47] **As** noted, a carrier needs to deploy a **DS3** of transport per 2688 VGEs. ***See supra*** note 45. Thus, to generate 18 DS3s of traffic, a competitive carrier would need to have customers that utilize nearly 48,000 VGE lines (18 * 2688 = 48,384).

achieve revenues above minimum viable scale) without causing market prices to crash unprofitably, particularly given that the typical high volume business customer obtains service from the incumbent pursuant to a long term contract

These same considerations also show why competitors are impaired under the *Guidelines*' third inquiry – *i.e.*, whether competitive carriers face systematic cost disadvantages relative to incumbents. Because of economies of scale and the risks inherent in deploying sunk facilities in competition with an entrenched incumbent with nearly all of the market, competitive carriers are likely to have higher costs than the incumbent over reasonably foreseeable levels of demand that they may serve. And, as discussed previously, competitive carriers are often subject to discriminatory charges for access to municipal rights-of-way. Thus, even if a competitive carrier might have costs below prevailing supracompetitive prices, by entering, it would **risk** the incumbent collapsing the price umbrella and setting prices that would leave uncovered its irreversible sunk costs

That said, the availability of unbundled transport at TELFUC-based rates can facilitate the deployment of competitive transport facilities Unbundled transport permits a competitive carrier to share in the incumbents' scale economies, thereby allowing the competitive carrier to obtain a reasonable cost structure, and to provide service immediately, thereby allowing the competitive carrier to construct the necessary transport facilities after being secure that the costs it must sink will be recovered. Further, although it is unrealistic to believe that a competitive carrier can capture the level of traffic that would make it feasible to build transport into any single LSO, unbundled transport can serve as a mechanism for allowing a competitive carrier to aggregate traftic from multiple LSOs to a "hub" and then self-deploy fiber transport to connect these hub points of concentrated traffic.[48] In this way, a competitive carrier can use unbundled transport to aggregate demand from relatively "low" volume LSOs, where the carrier could not economically deploy transport, to an aggregation point, where the competitor will have sufficient demand to justify constructing its own transport facility.

Finally, I would note that the fact that the relevant market for "transport" is point-to-point precludes any attempt by the incumbents (or others) to demonstrate lack of impairment in general based on a handful of instances of competitive supply of an element.[49] For example, the fact that there may be multiple transport providers in certain sections of downtown New York City says virtually nothing about the ability of competitive carriers to self-provide transport in other sections of the country SBC makes precisely this point when it argues that "[t]he fact that ILECs have deployed transport on *other* point-to-point routes has little if any bearing on whether deployment is viable on the route in question."[50]

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[48] *Id.* at 7. 25

[49] That said, as I have explained in my previous testimony, where there are sources of impairment that do not vary with geography – such as the inability of incumbent carriers to provide hot cuts necessary to self-deploy switches to serve customers connected to voice grade loops – this provides a basis for the Commission to conclude that a particular UNE should be available nationally.

[50] SBC Reply at 148 (emphasis in original)

Switching. Applying the *Guidelines*' entry analysis to switching shows that a competitive carrier would be impaired in seeking to provide local telecommunications services to residential and small business customers with its own switch, even if the competitive carrier were able to obtain cost-based unbundled access to incumbent loop and transport facilities

Although switching does not involve the same magnitude of sunk costs as transmission facilities – a switch can be moved from one location to another if service in the first location turns out not to be profitable – it nonetheless involves "significant sunk costs" within the meaning of the *Guidelines.* That is because substantial work must be done to install the switch. Again, using the Synthesis Model, it is possible to approximate quantitatively the percentage of switching investment that is sunk According to my calculations, at least 25 percent of switching investment is not recoverable if a carrier were to exit the market.[51]

Competitive carriers, however, must incur even *greater* sunk costs to deploy their own switches because they must incur additional sunk costs in order to connect a switch to customers' loops. Where a customer is currently receiving service from the incumbent using a voice grade loop – as is the case for virtually all residential and small business customers -- in order for a competitive carrier to serve such customers using its own switch, it must arrange to have the incumbent break the existing "hardwired" connection between the incumbent's switch and customer's loop, and re-establish a connection between the competitive carrier's switch and the customer's loop.[52] This "hot cut" is a classic sunk cost because it is paid up-front and is not recoverable upon exit. It is also a classic barrier to entry because it is a cost that the entrant must pay as a virtue of being a second mover, but a cost that the incumbent does not face. In fact, a hot cut charge of $35 amounts to 10 percent or more of expected first year revenues for an average residential account.[53] In addition, AT&T estimates that a competitive carrier also incurs

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[51] I assume for this purpose that roughly all of the "getting started" investment associated with switching (*e.g.*, main processors, software, etc.) is sunk I also assume conservatively that half of the wire center costs (*e.g.*, the building and fixtures used to support the switch) are sunk. This is appropriate because although the real estate and fixtures used in switching can be resold upon exit, much of the investment in wire centers is specific to switching and may be of little value to anyone using the building for another purpose. This leaves all of the per-line variable investments (*e.g.*, frame, line card, etc.) and the other half of the wire center costs as potentially recoverable should the entrant be forced to exit the business. Using the Synthesis Model's estimate of forward-looking switching investment, the former (sunk) investments amount to about 25 percent of total switching investments; and the latter (recoverable) investments amount to about 75 percent of total switching investments. I believe this is a substantial overstatement of recoverable costs because I am valuing the recoverable assets at their full original cost and am ignoring the costs ofredeployment.

[32] Not even the incumbents maintain that competitive carriers can replicate voice grade loops. Thus, even in areas where competitive carriers have self-deployed transport, they must still gain unbundled access to incumbent loops in order to provide telecommunications services.

[53] AT&T has provided data that show that the average local revenue from a consumer account is $29 per month (or $348 per year). ***See*** *Ex Parte* Letter from Joan Marsh to Marlene Dortch (Sept 25, 2002). This includes all sources of local revenue – *i.e.*, basic local, vertical features,

(continued. . .)

comparable sunk costs in coordinating the hot cut[54] – thus, the overall level of sunk cost incurred in just loop provisioning is nearly 20 percent of expected first year revenues for the typical residential customer. These loop provisioning costs – which are only a fraction of the overall costs that an entrant must sink in order to self-provide switching – are by themselves sufficient to establish the existence of "significant sunk costs" within the meaning of the *Guidelines*, which tests whether entry requires sunk costs that exceed more than five percent of first year revenues.

It is also the case that switching is characterized by steep scale economies. In addition to the cost of the switch itself, several items that support the switch also have significant costs that may not vary appreciably with volume These include the cost of the building that houses the switch, the cost of power and air conditioning, and certain test equipment. The basic cost of much of the software used to operate the switch also does not vary with usage, and this can be a significant and recurring cost over the life of the switch.

In his initial declaration, Dr. Clarke demonstrated that switching exhibited scale economies over the full range of demand, both under the assumption that the customer base is geographically diffuse or concentrated in particular clusters[55] The relative cost disparity is significant For example, whether it is assumed that a competitive carrier has a 30 percent market share in each of the clusters served by the incumbent in a state, or that the competitive carrier wins all of the customers in 30 percent of the neighborhoods served by the incumbent in the state. the competitive carrier would be at approximately a 40 percent cost disadvantage in self-providing switching *vis-à-vis* the incumbent. And because switching constitutes a sizeable percentage of the total costs of providing switch-based telecommunications services, this cost disparity puts competitive carriers at a significant disadvantage even should they be able to purchase loops and transport from the incumbent at TELRIC-based rates.

This analysis shows that switching has high minimum viable scale.[56] Competitive carriers, however, can effectively increase the scope of the relevant market that they can serve with their switches by employing a different type of network architecture than incumbents Specifically, rather than deploying numerous switches located in close proximity to customers, as incumbents do, competitive carriers instead typical deploy a single switch that serves a much broader geographic base than any incumbent switch does. To accomplish this, however, a competitive carrier must deploy much longer ''loops.'' In practice, this is done by using

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subsidies, the subscriber line charge, and exchange access. **A** $35 hot cut charge amounts to 10.1 percent of expected first year local revenues ($35/$348 = ,101). Unfortunately, comparable data are not available for small businesses. That should not change the overall conclusion because the number of residential lines far exceed the number of small business lines and, therefore, the weighted average of the revenue opportunity available to competitive carriers will be near the average value for residential customers ($29 per month).

[54] *See* AT&T *Ex Parte*, Promoting Mass-Market Competition, at 10 (Nov. 8, 2002) (*"AT&T Mass Market Competition Ex Parte"*).

[55] AT&T, Clarke Dec., Exh. 1-10

[56] ***See Guidelines*** § *3.3* n.31 (minimum viable scale is high where fixed costs are large and sunk).

combinations of loops and transport facilities to connect the customer to the competitive carrier's switch Competitive carriers in this way can achieve switch utilization and, therefore, switching scale economies, comparable to those achieved by the incumbents

But this type of "flat" network architecture also requires competitive carriers to incur systematic, non-transitory costs that incumbents do not – cost disadvantages that would be considered a barrier precluding entry under the *Guidelines*. First, as discussed, a competitive carrier must pay the incumbent for a hot cut to break the connection between a customer and the incumbent's switch and re-establish that connection onto the competitive carrier's network

Second, because, for the reasons stated above, competitive carriers cannot generally replicate incumbent loop and transport facilities, they need to lease incumbent-provided transmission facilities to reach customers Thus, absent loop-transport UNE combinations (without use and co-mingling restrictions),[57] Competitive carriers must collocate in every central office where they want to gain access to loops. That in turn requires the competitive carrier to incur substantial collocation costs that the incumbent does not have to bear. Further, as explained, regardless of whether a competitive carrier self-deploys transport or leases it from the incumbent, in order for that competitive carrier to serve a large geographic area with its switch, the competitive carriers must also incur substantial, distance sensitive, "backhaul" costs – *i.e.*, the costs incurred in carrying traffic from the incumbent LSO, where customers' loops terminate, to the competitive carrier's switch This includes not only the costs of the transport itself, but of the DLC equipment that is necessary to digitize and multiplex the traffic from dedicated loops so that it can be carried on the shared transport network. In contrast to the collocation and backhaul costs that competitive carriers must incur, incumbents obtain substitute functions by merely running a short wire across the main distribution frame in the central office

In this regard, it is no answer to claim, as the incumbents have, that "the need to backhaul traffic . . . is purely a function of a CLEC's ability and decision to deploy fewer switches with broader geographic scope and to use more transport to serve those fewer switches. . . CLECs could deploy more switches, coincident with every TLEC switch, and thus eliminate or substantially reduce the need for backhaul facilities."[58] This is sheer hypocrisy, as the

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[57] Although the incumbents do not deny that that collocation requires competitive carriers to bear substantial costs that they do not, the incumbents claim that "special access services" can be used as a substitute for loop-transport combinations thereby allowing a competitive carrier to avoid collocation-related expenses. *See* SBC Reply at 137. The incumbents are correct that special access services potentially allow a competitive carrier to avoid collocation costs, but they are wrong in contending that special access services are an adequate substitute for loop-transport UNE combinations. **As** I explained above, to the extent access services are priced substantially above TELRIC – and the evidence is that they are – they put the competitive carrier at a substantial cost disadvantage relative to the incumbent. Thus, without access to loop transport combinations a competitive carrier must face a Hobson's Choice. It can either use special access services and internalize a cost structure that could make it impossible to compete with the incumbent, or it can collocate at a wire center and have to pay substantial collocation costs that the incumbent does not incur

[58] SBC Reply at **138** (emphasis omitted)

incumbents do not allow competitive carriers to collocate end office switches in incumbent central offices. But more fundamentally, even if such collocation were permitted, competitive carriers clearly do not have the customer base to justify deploying the same number of switches as incumbents Any competitive carrier that attempted to deploy a switch "coincident with every ILEC switch' would find itself with massive overcapacity. Thus, to achieve the same scale economies for switching as incumbents, competitive carriers must deploy the same high capacity switches used by incumbents, but because they have a much lower density base of customers, they must then serve a much broader geographic base with each switch than the incumbent. That, by definition, means incurring backhaul costs that incumbents do not have to incur due to their enormous, concentrated customer bases.

AT&T's network professionals have quantified the magnitude of the costs a competitive carrier must incur to obtain "loop connectivity" between the customer and the competitive carrier's switch These calculations show that for the average residential customer, the costs of just loop connectivity alone would range from slightly below to well above expected revenues.[59] Similarly, the loop connectivity costs are a substantial fraction of the revenues that would be generated by the typical small business customer.[60] Notably, AT&T's analysis shows that these substantial loop connectivity costs exist if it is assumed either that the carrier serves a handful or thousands of loops in the central office[61] AT&T has also quantified the "cost disadvantage" competitive carriers face in connecting the loop to the switch – *i.e.*, the costs attributable to the hot cut, the DLC multiplexing equipment, backhaul transport and other necessary network facilities that the competitive carrier must incur but that the incumbent does not – and shown that these costs constitute a sizeable fraction of expected revenues.[62] Thus, when the other costs of providing retail service are added, such as the cost of switching itself, marketing, billing, customer care and provisioning, there is simply no way for competitive carriers profitably to serve a large majority of residential and small business voice customers using their own switches. Under the *Guidelines*, these economic facts conclusively demonstrate that, if competitive carriers are forced to self-provide switching to serve residential and small business customers, entry is unlikely to occur

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[59] *AT&T Network Architecture Ex Parte* at 21. AT&T has also shown that even when a residential customer's loop terminates in an LSO where it has deployed fiber transport facilities, the loop connectivity accounts for at least 80% of retail revenues, regardless of the volume of customers served. *Id.*

[60] *Id.* 20.

[61] *Id.*

[62] ***See generally AT&T Mass Market Competition Ex Parie.*** On a conservative basis, a competitive carrier will incur $7 per month per-line more than the incumbent to connect a loop to a switch. *Id.* This amount represents approximately **24** percent of expected revenues for a residential customers, assuming that the competitive carrier provides both local and toll services. **See *supra*** note *53* (explaining that the typical residential customer generates approximately $29 per month in local revenues).

3. Sufficiency of Entry. Lastly, the ***Guidelines*** not only require that prospective entry be likely, but also that it be "sufficient."[63] The fact that a single firm may be able to self-supply an element does not necessarily mean that access regulation is no longer necessary to prevent the incumbent carriers from exercising market power. The *Guidelines* recognize this point, and hold that entry is not sufficient unless "***multiple*** *entry generally* ***is*** *possible* and ***individual*** *entrants may flexibly choose their scale*."[64] In this regard, even the incumbents now recognize that "the mere presence of a single competitive facility in a particular market [does not] necessarily preclude[] a finding of impairment in that market."[65] Thus, the incumbents acknowledge that competitive carriers are impaired without unbundled access to the incumbent's network elements unless the entry barriers (like those identified by the *Guidelines*) are sufficiently attenuated so that ***multiple*** carriers can profitably duplicate the facility in question., as needed to support competitive outcomes.

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In conclusion, I believe the entry framework used by the ***Guidelines*** can – and should – inform the commission's impairment analysis. And for the reasons stated above, rigorous application of that framework shows that competitive carriers would, in general, be impaired if they are denied unbundled access to loops, transport and switching facilities.

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[63] *Guidelines* § 3 4

[64] *Id.* (emphasis added).

[65] SBC Reply at 10